

FABRICATION OF CORDO PLASTAZOTE OR PELITE REMOVABLE LINER FOR CLOSED SYME SOCKETS

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INTRODUCTION

The Syme's amputation leaves the long bones of the leg intact with only a small portion of the tibia removed. The tissues of the heel are well suited for weight-bearing and usually provide the patient with a good end-bearing stump.

Since the use of plastics in prosthetics, the VAPC medial-opening and the Canadian posterior-opening Syme's prostheses have become quite popular. Although both prostheses provide fine function, they tend to be heavy and bulky because of the thick socket walls required to withstand the high stresses at the ankle around the opening.

A more recent development permits a thin-walled prosthesis to better withstand the high stresses by the use of a non-opening socket design. With the integrity of the socket wall intact, a relatively thin wall was found to be much superior in strength to the open-wall-type prostheses. The first models were fabricated with an inner liner of soft material in the smaller diameter of the ankle section to permit the passage of the bulbous stump end into the socket. However, the built-in liner posed many disadvantages regarding socket modification, replacement of liners, weight of appliance, and difficulty of fabrication. The most recent socket liner developments overcome these difficulties by designing the socket shell over a removable liner made of Cordo Plastazote or Pelite.

The following presents a step-by-step procedure for fabricating the newly designed removable liner.

FABRICATION PROCEDURE

Table 1 contains the materials necessary for the fabrication of a Cordo Plastazote or Pelite liner.

Fabrication of the removable liner should not be started until the modified male cast has dried thoroughly. The thorough drying of the

Byers: Removable Liner for Closed Syme Sockets

TABLE 1.—Materials

1. Modified Cast
2. Rubber Balloon
3. Powder
4. Nylon Hose
5. Tube Gauze
6. Cordo and SOL-50^a
7. Plastazote or Pelite

^a **WARNING:**—Cordo or Cordo Solution must be used only in a *very well ventilated* area. Failure to do so may result in illness or cause a serious effect on the respiratory system.

cast facilitates breaking the plaster cast for easy removal after completion of the lamination.

1. Hold the cast in a horizontal position.
2. Place a cast sock or two layers of tube gauze over the cast.
3. Introduce powder into a rubber balloon and inflate it, making certain that the nipple on the end of the balloon is fully inflated. (When placed over the cast, the balloon acts as a separator, and gives the inside of the liner a smooth surface.)
4. Invert the balloon over the cast and work out all excess air and wrinkles.
5. Apply one coat of Cordo directly on the rubber balloon and allow to dry (5–10 min.).
6. Apply one inverted nylon hose to the Cordo-coated balloon. Coat with Cordo and allow to dry (10–15 min.). Apply a second coat of Cordo to the nylon and allow to dry.
7. Use a length of tube gauze approximately 1½ to 2 times the length of the cast, knot one end, and pull it over the cast. Coat it twice with SOL-50,^a allowing to dry completely between coats (approx. 15 min.).
8. Apply a second layer of tube gauze over the cast and coat it twice with SOL-50, allowing to dry completely between coats.
9. Apply a third layer of tube gauze over the cast and coat it twice with SOL-50, allowing to dry completely between coats.
10. After the Cordo liner has completely dried, the distal cap portion of the foam build-up is applied. A piece of Plastazote or Pelite, large enough to cover the distal end of the cast, is cut and hand-sanded on one side to roughen the surface. Super-Bond is then applied and allowed to dry. The corresponding area of the Cordo-covered cast is also coated with Super-Bond. Heat the Plastazote or

^a SOL-50 is a solution of Cordo and Paraplex 50. Note warning on use of Cordo Solution.

Pelite until pliable and then apply to the cast. It is molded by hand until cooled. The Plastazote is then ready to be skived as shown in Figure 1.

11. At this point the liner is ready to receive the Plastazote or Pelite build-up in the ankle area. The build-up will extend from the circumference measurement of the bulbous distal end to a matching circumference measurement proximally in the calf area, as seen in Figure 2.

NOTE: The proximal measurement should not vary from the distal measurement by $\pm 1/4$ in.

The ankle area build-up is made by using several consecutive layers of $1/4$ in. Plastazote or Pelite bonded together with Super-Bond cement.

12. Cut a piece of Plastazote or Pelite of the proper length and width to completely encompass the circumference of the leg area to be covered. Using a sander, skive one edge of the Plastazote or Pelite along the full length. Apply Super-Bond cement on the skived edge. Roughen the opposite surface with sandpaper. Apply Super-Bond cement to the sanded side of the Plastazote or Pelite sheet and

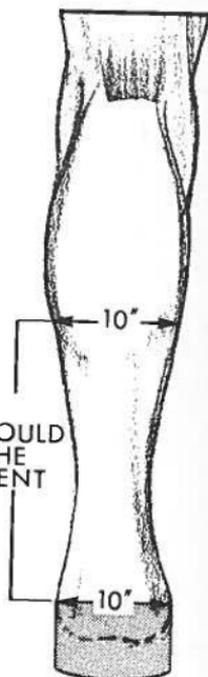


BEFORE

FIGURE 1



AFTER



NOTE:
THE PROXIMAL
MEASUREMENT SHOULD
NOT VARY FROM THE
DISTAL MEASUREMENT
BY $\pm 1/4$ "

FIGURE 2

allow it to dry. After the Super-Bond has been applied to the Plastazote or Pelite, the surface area of the Cordo liner that is to be covered is also coated with Super-Bond and allowed to dry until both surfaces are no longer tacky (Fig. 3).

13. Once the Super-Bond has dried sufficiently, the Plastazote or Pelite is applied to the liner. The skived edge of the Plastazote or Pelite is centered on the posterior long axis of the cast and placed parallel to the medial and lateral sides of the cast. Once the skived edge of the Plastazote or Pelite has been centered on the liner and glued to the edge, the entire sheet is heated with a heat gun until it becomes pliable. It is then wrapped around the circumference of the liner to overlap the skived edge. The excess material is trimmed off (Fig. 4).
14. After the Plastazote or Pelite has cooled, sand off all excess material blending in the proximal, distal, and posterior aspects of the Plastazote or Pelite to the desired measurements (Fig. 5). After the above areas indicated by the arrow have been blended, check the

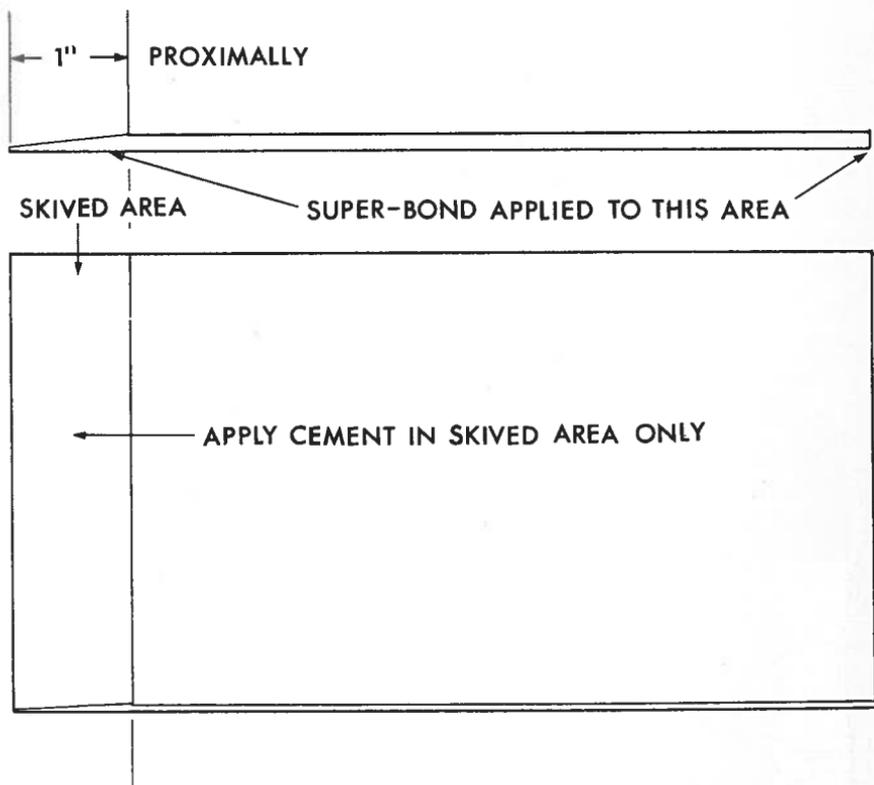
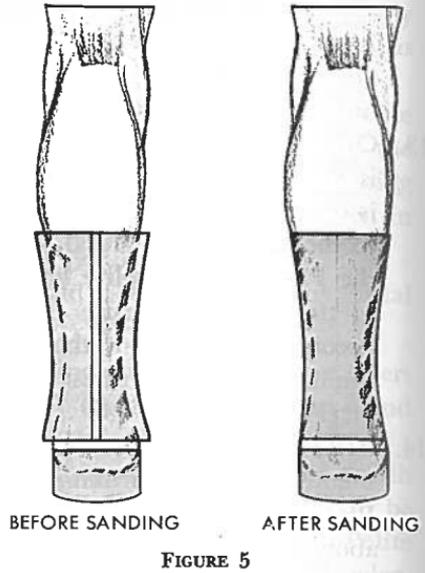
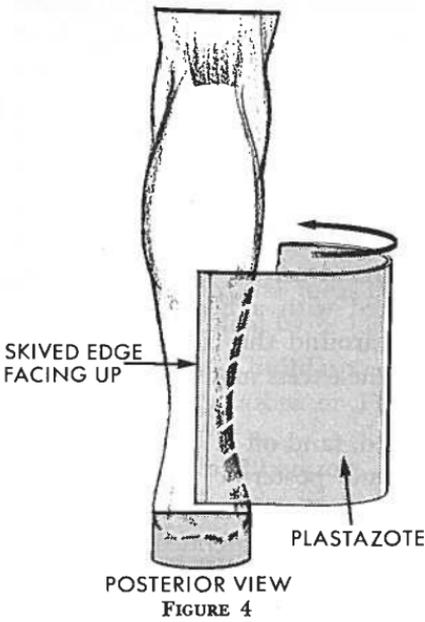
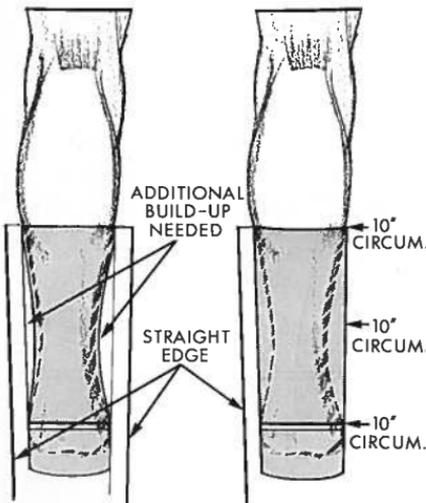


FIGURE 3



areas that need additional build-up by placing a straightedge from the proximal circumference where the build-up started spanning the ankle to the distal end of the cast (Fig. 6). When the additional build-up is completed, the body of the liner should form a straight line from the proximal to the distal circumference measurement and should be the same circumference (Fig. 6).

15. When the build-up is completed, apply the external layers of tube gauze, Cordo, and nylon.



16. Apply a fourth, fifth, and sixth layer of tube gauze to the liner. Coat each layer twice with Cordo and allow to dry completely before application of each layer.
17. The final step in the fabrication of the liner is completed by applying one nylon hose to the liner. Coat it twice with Cordo and allow a proper drying time between coats.

**FITTING OF THE CORDO PLASTAZOTE OR PELITE
REMOVABLE SYME'S LINER**

At the time of fitting the Syme's prosthesis with a removable liner, it may be necessary to slit the liner in the area of the Plastazote or Pelite build-up.

The following is the procedure for determining the location of slits on a Cordo Plastazote or Pelite liner:

1. The patient places his stump into the liner until the narrow area above the bulbous distal end will no longer permit entry.
2. The point at which the stump no longer enters the liner is marked on the medial side, and the liner is removed.
3. A slit is made along the long axis of the liner from approximately $\frac{1}{2}$ in. above the mark on the medial side extending to within $1\frac{1}{2}$ in. from the distal end (Fig. 7).
4. In cases with extremely bulbous stumps, the above procedure can be repeated on the lateral side of the liner.

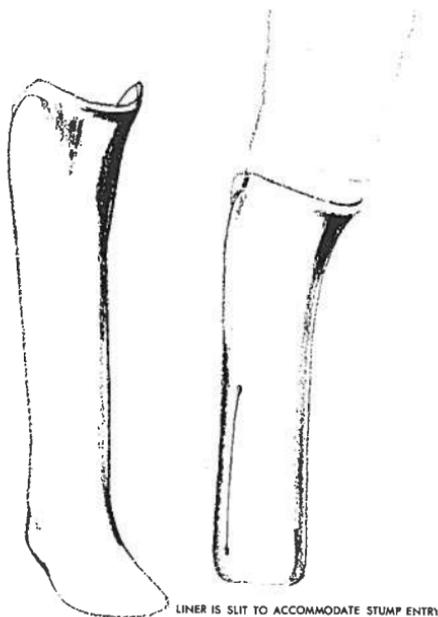


FIGURE 7

The slits in the medial and lateral sides of the liner in no way impair the function of the liner. Once the liner is placed into the prosthesis, the slits are closed by the external pressure from the walls of the socket. The stump applies a counterpressure on the liner and closes the slits to their original position, leaving no seams to irritate the patient's stump.

SUMMARY AND CONCLUSIONS

A method of fabricating Cordo-Plastazote or Cordo-Pelite removable liners for Syme's amputations, which provides a minimum of bulkiness, has been described. This procedure has resulted in improved cosmesis and comfort for the amputee.

The Clinic at the VA Prosthetics Center has fabricated approximately 16 of these liners for amputees and the reported results are very satisfactory.